Bounded Flexibility Search and Interface for Travel Reservations

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Field of the Invention

The present invention relates generally to the field of selecting travel products, and more specifically to a system and method of selecting travel products including range searches for all search criteria.

Background of the Invention

Suppliers of travel products, such as package vacations, airplane flights, and hotels, have developed a distribution system used by travel agents to help travelers select a particular travel product. Information is delivered to the traveler in several different ways. Travelers can solicit the services of a travel agent who usually uses one of several universal search platforms (e.g. Sabre, Amadeus) and checks for availability and fare information on a particular route and set of dates the traveler is interested in. Alternatively, travelers can call the reservation desk of an airline company and receive a potentially broader selection of fares that, however, is limited to the services that the airline in question and its partners and affiliates offer. A third, recently introduced option is for the traveler to visit either an online travel agent (e.g. Expedia, Travelocity) or an airline website and perform an availability and fare search directly on the Internet.

Currently there are two types of searches available across all these modes of distribution of travel related services. The first type requires the input of specific travel dates, origin and destination and displays all available fares that meet the criteria specified and are in the travel database that is searched. This search is widely available and is usually termed "schedule search." The limitations of this search are that if a traveler has flexible travel plans the search cannot practically show all the options that meet the traveler's criteria and let the traveler choose the best option. Take for example a typical spring break traveler who wishes to travel from Boston to Western Europe, departing between 5pm on March 20 until March 22 and returning between March 29 until noon on April 1, spending at least 9 days in Western Europe. If that traveler uses a schedule search, they will have to perform over 2,000 searches, manually

eliminate flight times that do not fit their schedule on March 20 and April 1 and sort by best available price. This is not only impractical (at five minutes per search it requires 167 hours) but also impossible to do since airline seat availability and fare information is updated at least every fifteen minutes. Most travelers and travel agents look at several more popular options and choose the best alternative, disregarding alternatives that have not been explored (e.g. the spring break travelers discussed will probably not look at airfares to Dusseldorf and therefore may potentially miss a lower fare that gets him right at heart of Western Europe).

The second type of search available requires the input only of an origin and destination and returns a list of all fares offered between the two points of travel. While this allows travelers to quickly compare alternative routes (e.g. Boston-London, Boston-Paris, Boston-Milan), it does not guarantee that any of the displayed fares will actually be available on the particular dates the traveler wishes to travel. Most travel reservation systems (e.g. Travelocity) usually request the traveler to choose a particular fare and then show calendars with days when that particular fare is available. As a second step the traveler has to choose his desired date of departure and return at which point the system checks for seat availability and either makes the reservation or returns a message that there are no seats available. Given that significant number of the cheaper fares are limited to travel only on particular days of the week and that availability for them is fairly limited, booking a ticket in this way usually requires the traveler to check several fares before being able to find travel arrangements that meet his timing constraints. In addition, once the cheapest fare on a particular routing is not available, the traveler usually has to reprioritize his choice of destinations and see whether some other destination is not now cheaper to travel to. Thus, in order to find the best fare, a traveler must check a number days on a number of fares on a number of routings. The spring break traveler in the above example will have to check nine departure date/arrival date combinations on average of three to five fares across fifty destinations. That results in between 1,350 and 2,250 searches, which again makes performing an exhaustive search to find the best alternative not only impractical but also impossible due to changes in seat availability and fare information.

Summary of the Invention

The present invention is an alternative search type applicable to all modes of distribution of travel related services. Unlike both the schedule and the fares offered searches, the system and method of the present invention makes travel plans reservations convenient and less time-consuming through a bounded flexibility search, allowing travelers to enter information in a range rather than a point-to-point format. In one preferred embodiment, the present invention introduces a new type of travel search that enables the user to perform an exhaustive search of travel alternatives over the entire range of their flexibility along different criteria (e.g. travel dates and times, geographies, length of stay). In another preferred embodiment, the invention is a method for segmenting the travel market and customizing the search interface across different customer segments.

Brief Description of the Drawing

The invention is described with reference to the several figures of the drawing, in which,

Fig. 1a depicts an interface using point-to-point range searches;

Fig. 1b depicts an interface using geography range searches;

Fig. 2a is a process flow chart illustrating the process of compiling, receiving, and sorting travel data during a point-to-point range search;

Fig. 2b is a process flow chart illustrating the process of compiling, receiving, and sorting travel data during a geography range search;

Fig. 3.1 is a process flow chart illustrating the process of customization of the search interface for an existing customer;

Fig. 3.2 is a process flow chart illustrating the process of customization of the search interface for a new customer; and

Fig. 4 depicts an interface for date range searches.

Detailed Description

Referring now to the figures of the drawing, the figures constitute a part of this specification and illustrate exemplary embodiments to the invention. It is to be understood that in some instances various aspects of the invention may be shown exaggerated or enlarged to facilitate an understanding of the invention.

The present invention discloses an apparatus and method for providing a plurality of alternative travel itineraries based on geography and time range searches and allowing the user to select the best air travel product for them. In one embodiment of the present invention, the user can choose to execute a point-to-point or geography range search by selecting the search type from the user interface menu (see **Fig. 1a**, Field L). **Figure 1a** shows an interface using point-to-point range searches. Point-to-point search refers to a range search where the origination and destination are single points (e.g. Boston to London) rather than ranges (e.g. New England to Western Europe). Figure 1a describes the interface for collecting the information necessary to conduct a point-to-point range search. The origin and destination information is collected in Fields A and B. The maximum connections information is collected in Field J. The information on the timing flexibility of the trip is collected in Element 1, which consists of three sections: outbound flight, inbound flight and length of stay. In one aspect, the traveler has the option to choose whether the times and dates he is providing for the inbound flight are departure or arrival times and dates. For example, if a traveler wants to depart between 10am and 1pm on March 21, he will choose "I want to depart between" and fill in the corresponding dates and times. If, however, the traveler wants to arrive at his destination between 10am and 1pm on March 21, he will choose "I want to arrive between" and fill in the corresponding dates and times. After specifying whether the travel must originate or end in a particular time interval, the traveler enters the dates and times that describe the time interval during which he is willing to travel (see Fig. 1a, Fields C1, C2, D1 and D2). Alternatively, instead of, or in addition to, entering the dates and times in Fields C1, C2, D1, and D2, the traveler may also specify the dates and times by highlighting the dates and times with a user interface that includes a graphical depiction of a calendar 40, as shown in Fig. 4. Whether the traveler wants to specify an outbound date range or an inbound date range, the traveler can simply "click" on the earliest and latest dates 50, 60. Likewise, the same information is collected for the inbound flight. In another aspect, the traveler

has the opportunity to specify a range for the desired length of stay at their destination (see Fig. 1a, Fields G1, G2 and G3).

In one aspect, information on preferences about sorting of results is collected from the user (see Fig. 1a, Element 2). The traveler is requested to sequentially rank sorting criteria for the results of the searches in a series of pull-down menus (see Fig. 1a, Fields K1-K4). The sorting criteria may include, for example, price, trip length, departure date and time, arrival date and time, mileage, number of connects, or airline.

In another preferred embodiment, the user selects from various geography range searches. **Fig. 1b** shows an interface using geography range searches. In this embodiment, Fig. 1b, Element 3 replaces Fig. 1a, Fields A and B. In one aspect, the user chooses a point-to-range search. In this aspect, the user chooses a departure area/airport and a predefined list of arrival regions (see Element 3 containing Fields A and H). In another aspect, the user chooses a range-to-range search. In this aspect, the user chooses a predefined list of departure regions and a predefined list of arrival regions (see Element 3 containing Fields I and B). In a final aspect, the user chooses a range-to-point search. In this aspect, the user chooses a predefined list of departure regions and an arrival area/airport (see Element 3 contains Fields I and H). In one embodiment, the predefined list of departure and arrival regions are selected from a pull-down menu (see Fields I and J). Note that "region," as it is used herein, need not imply a contiguous geographic region, but may include any set of airports or other locations that a user might wish to search on simultaneously.

If the user selects at least one predefined departure or arrival region, the system displays a list of available airports within that predefined region (see Element 4). In one embodiment, the user selects a range-to-range search in which the system displays a list of available airports within both the predefined departure and arrival destination. In one aspect, the system displays a number of pre-populated airports or cities to/from which he can travel. In another aspect, the system displays open positions in which the user can specify airports or cities not already on the list. Fig. 1b, Element 4 shows a list of ten cities in total with eight pre-populated cities and two open positions. The user can select and deselect as many cities as they want to specify in their search. In one aspect, the user can select "all" or "none." Selecting "none" would clear the selection for the user to start with nothing selected.

In another preferred embodiment, the interface continues to collect information from the user about time flexibility and sorting preferences as described in the point-to-point search.

Fig. 2a illustrates the present invention's system point-to-point search flow of information processing and the display of results. In one preferred embodiment of the present invention, the system generates a set of feasible combinations of departure-arrival airports generated from a point-to-point search (see List 3) including: a list of outbound dates that are before the latest departing date (see D1) and after the earliest departing date (see C1) and a list of inbound dates that are before the latest arrival date (see F1) and after the earliest arrival date (see E1). The length of stay between two corresponding entries in the list of feasible combinations is calculated. All entries with a length of stay greater than maximum number of days or weeks specified by the user or less than the minimum number of days or weeks specified by the user is eliminated from the list of feasible combinations. In one aspect, the output of feasible combinations is reported in a database (see Database 1) with at least the following fields: departure date, arrival date, inputted length of stay, calculated length of stay of each combination, departure area/airport, arrival area/airport and maximum number of combinations. In another aspect, if there are no feasible entries, the user is notified by the system with a message to that effect. For example, the system may return a message stating "You specified no feasible combinations of travel date and time inputs."

After the information is stored into an initial database (see Database 1), the system sends a regular fare/route/availability inquiry to a travel database (e.g. SABRE) for each row of information stored in the initial database. The initial database is amended with the results from the inquiry, creating all necessary fields to store the information (e.g. price, departure time, arrival time).

In one aspect, entries with an outbound departure time listed before the earliest departure time or after the latest departure time inputted by the user are eliminated from the database. Entries with an outbound arrival time listed before the earliest arrival time or after the latest arrival time inputted by the user are eliminated from the database. Similarly, entries with an inbound departure time listed before the earliest departure time or after the latest departure time inputted by the user are eliminated from the database. Entries with an inbound arrival time listed before the earliest arrival time or after the latest arrival time inputted by the user are eliminated from the database.

In another aspect, all entries with a number of connections greater than those specified by the user are eliminated.

Finally, information still remaining is sorted by preferences selected by the user sequentially (see K1, K2, K3, and K4) and is displayed to the user.

Fig. 2b illustrates the present invention's system geography range search flow of information processing and the display of results. In one preferred embodiment of the present invention, the system generates a set of feasible combinations of departure-arrival airports generated from a geography range-to-range search wherein the user selects departure and arrival geography ranges. The system queries an information database (see Database 2) for airports within the selected departure and arrival geography ranges and returns airport information to be displayed to the user. In one aspect, the user selects airports from a number of pre-populated airports or cities to/from which he can travel. In another aspect, the the user can specify airports or cities not already on the list in open positions. The user can select and deselect as many cities as they want to specify in their search. In one aspect, the user can select "all" or "none." Selecting "none" would clear the selection for the user to start with nothing selected.

In one aspect of this embodiment, the system generates a set of feasible combinations of departure-arrival airports generated from a range-to-range search (see List 5) including: a list of outbound dates that are before the latest departing date (see D1) and after the earliest departing date (see C1), a list of inbound dates that are before the latest arrival date (see F1) and after the earliest arrival date (see E1), and a list of all feasible combinations between departure-arrival airport combinations and outbound and inbound dates combinations (see List 4). The length of stay between two corresponding entries in the list of feasible combinations is calculated. All entries with a length of stay greater than maximum number of days or weeks specified by the user or less than the minimum number of days or weeks specified by the user is eliminated from the list of feasible combinations. In one aspect, the output of feasible combinations is reported in a database (see Database 1) with at least the following fields: departure date, arrival date, inputted length of stay, calculated length of stay of each combination, departure area/airport, arrival area/airport and maximum number of combinations. In another aspect, if there are no feasible entries, the user is notified by the system with a message to that effect. For example, the system may return a message stating "You specified no feasible combinations of travel date and time inputs."

After the information is stored into an initial database (see Database 1), the system sends a regular fare/route/availability inquiry to a travel database (e.g. SABRE) for each row of information stored in the initial database. The initial database is amended with the results from the inquiry, creating all necessary fields to store the information (e.g. price, departure time, arrival time).

In one aspect, entries with an outbound departure time listed before the earliest departure time or after the latest departure time inputted by the user are eliminated from the database. Entries with an outbound arrival time listed before the earliest arrival time or after the latest arrival time inputted by the user are eliminated from the database. Similarly, entries with an inbound departure time listed before the earliest departure time or after the latest departure time inputted by the user are eliminated from the database. Entries with an inbound arrival time listed before the earliest arrival time or after the latest arrival time inputted by the user are eliminated from the database.

In another aspect, all entries with a number of connections greater than those specified by the user are eliminated.

Finally, information still remaining is sorted by preferences selected by the user sequentially (see K1, K2, K3, and K4) and is displayed to the user.

In a preferred embodiment, the user can access a remotely accessible source for making travel destination reservations. In other preferred embodiments of the present invention, the user can search the system for hotels, car rental services, railroad travel, bus travel and other travel-related availability or prices.

In another embodiment of the present invention, the method and system incorporates a search interface customization. **Fig. 3.1 and Fig. 3.2** illustrate the process flow of a search interface customization. In one aspect, the system queries the user for information regarding their customer status. The user may input that they are a new customer or returning customer. If the user is a new customer, the system queries the user to select and input a username and password (see Fig. 3.2). The system looks up the username in a database (ex. Database 3) and determines whether this username has been secured by another customer. If so, the system returns a message to the login screen to that effect (ex. "Username Already Taken"). If the username has not been secured by another customer, the system creates a new entry in the database (Database 3) with the username as the unique designator. The system then retrieves a

list of segmentation and profile questions from another database (ex. Database 5), displays these questions and queries the user to create a profile by answering the questions, before proceeding to a search. The user's answers are stored in the database (Database 3). In another aspect, the system looks up the combination of answers to the segmentation and profile questions in a database (ex. Database 5) and assigns the user to a unique "Customer Type" profile. The system then looks up occasions for the "Customer Type" (ex. in Database 5) and appends the user information stored (ex. in Database 3) with "Customer Type" and list of occasions information.

If the user is a returning customer, the system queries the user for a previously established username and password (see Fig. 3.1). If the information is entered incorrectly, the system returns a message to the login screen to that effect (ex. "Incorrect Password"). If the information is entered correctly, the system looks up the username in a database (ex. Database 3) and retrieves a list of occasions and customer type designations. The system displays a list of occasions (e.g. business travel, family break, quick get-away) and queries the user to choose at least one. Once the occasion is selected, an associated set of preferences can be used to customize the search.

Other embodiments of the invention will be apparent to those skilled in the art from a consideration of the specification or practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.